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American Potato Journal

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A POTATO PLAN

In a recent address Secretary of Agriculture Henry A. Wallace stated, "The cotton plan, the corn and hog plan, the dairy, tobacco, fruit and wheat programs that we are now launching—all these are experimental steps in a new direction. Once you take the first step in that direction you are forced to other steps and a wider outlook." It is unnecessary to refer to what is being done to rehabilitate other agricultural industries. Needless to say that drastic changes are being made. It is no longer possible for every individual to conduct his business as he sees fit. The new deal has brought new times. As Secretary Wallace says, "Today unregulated individual efficiency brings us social disaster."

Is the potato industry to be overlooked in making these changes in the agricultural set up? Are we to go on as in past years, producing crops so far in excess of demand that ruin results? Apparently some of the leaders of the potato industry believe this to be an unwise procedure. Recently, leaders from seven western states discussed and approved the so-called California plan for the orderly marketing of the potato crop. It is impossible to present this plan here but in the words of its sponsors, it "proposes to limit the quantity of potatoes marketed annually and to regulate the flow of potatoes to market seasonally. Both objectives are to be accomplished through contracts among associations of producers, dealers and the Secretary of Agriculture. The administration of this plan is effected through the issuance of tags to individual growers." It appears that a plan to establish the potato industry is imminent. It would be a serious mistake, however, to adopt any plan which does not have the consideration and approval of growers in the different sections. All potato growers should consider the California plan carefully.

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FERTILIZER PLACEMENT STUDIES ON SASSAFRAS LOAM WITH THE POTATO IN NEW JERSEY[a]

WM. H. MARTIN
New Jersey Agricultural Experiment Station
B. E. BROWN
Bureau of Chemistry and Soils[b]
G. A. CUMINGS
Bureau of Agricultural Engineering[b]

INTRODUCTION

In 1932, Martin and Brown[1] presented results of field experiments conducted in New Jersey in 1931 with both early and late planted Irish Cobblers to determine the comparative influence of different fertilizer placement methods on germination, growth and yield. These studies indicated that, regardless of the plant food concentration of the fertilizer, low yields resulted when the fertilizer was applied in the row, particularly if it came in contact with the potato seed piece through poor mixing with the soil. It was also found that application of fertilizer either over or under the seed piece resulted in lower yields than from placement of the fertilizer in bands on each side of the seed piece, either on the same or a lower plane. The results were also presented at the Chicago meeting of the Joint Committee on Fertilizer Application November, 1931, as part of a general report covering cooperative fertilizer placement studies in Michigan, New Jersey and Ohio.[2]

The fertilizer placement studies were continued in New Jersey in 1932 with early planted Irish Cobblers in the field where an early

[a] The New Jersey fertilizer placement studies are a part of general field investigations being conducted on prominent potato soil types in Maine, Michigan, New Jersey, Ohio and Virginia. Individual reports and a general write-up covering results obtained in these potato producing sections are to be issued.

[b] United States Department of Agriculture.

[1] Martin, W. H., and Brown, B. E. Fertilizer Placement Studies with the Potato. Proceedings 18th Annual Meeting, Potato Assn. of America, Dec., 1931.

[2] A Progress Report on Cooperative Fertilizer Placement Studies on Potatoes in 1931. Report presented by B. E. Brown for the various cooperating agencies to the Joint Committee on Fertilizer Application in Chicago, November 18, 1931.

crop experiment was conducted the previous year, a report covering the yields being presented to the Joint Committee on Fertilizer Application at its 8th Annual Meeting in Washington, D. C., November 16, 1932.[3]

The plot yields of the early planted crop in 1931 were generally greater than in 1932, due primarily, no doubt, to a deficiency of rainfall in the latter year. In 1931 there was a rainfall of 21 inches during the period from April to August 1, as against 13 inches during the same period in 1932. That this influenced yields is apparent from the fact that in 1931 the average yield of the plots receiving no fertilizer was 207.8 bushels as compared with 188.1 bushels in 1932. In 1931 the greatest increase of the fertilizer over the check plots was 123.9 bushels as compared with 66.7 bushels in 1932. It may be noted here, however, that despite the marked difference in yields between the plots receiving fertilizer and those receiving none, the relative position of the plots receiving fertilizer in the different locations has been much the same for the two years.

FERTILIZER PLACEMENT WORK IN 1932

In the 1932 placement studies, three fertilizer analyses were employed, namely, a 4–8–7, 8–16–14 and 12–24–21. As the last was used in only one of the different placements it will not be considered in this report. The ingredients entering into the 4–8–7 mixture (made up on a nitrogen basis) were sodium nitrate, ammonium sulphate, dried blood, superphosphate and muriate of potash; in the 8–16–14 mixture, sodium nitrate, ammonium sulphate, dried blood, Ammophos and muriate of potash. The 4–8–7 mixture was applied at the rate of 2000 pounds per acre and the 8–16–14 at 1000 pounds per acre. All of the fertilizers were applied with a special machine built by the Federal Bureau of Agricultural Engineering.[4]

The soil type on which the fertilizer placement experiments are being conducted is a Sassafras loam. Potatoes were grown on the field in 1930 and 1931, clover in 1929, wheat in 1928 and potatoes in 1927. Certified Irish Cobblers were planted on April 27 and 28. At planting time the moisture content of the soil was 17.3 per cent.

Six methods of fertilizer placement were compared in 1932, as follows:

1. Fertilizer in two separate bands two inches to the side and on the same plane as the seed piece.

[3] Brown, B. E., and Martin, W. H. Results from Machine Placement of Fertilizer on Potatoes in New Jersey for 1932. Proceedings of the Eighth Annual Meeting of the Joint Committee on Fertilizer Application, November, 1932.

[4] A detailed description of the machine will be given in a report covering the cooperative fertilizer placement work in all sections.

2. Fertilizer in two separate bands four inches to the side and on the same plane as the seed piece.
3. Fertilizer in two separate bands two inches to the side and two inches below the plane of the seed piece.
4. Fertilizer in band 4–5 inches wide, over the seed piece with two inches of soil between the fertilizer and seed piece.
5. Fertilizer in a band 4–5 inches wide, under the seed piece with two inches of soil between the fertilizer and seed piece.
6. Fertilizer thoroughly mixed with soil in the furrow.

The field experiment provided for rows over 630 feet long and each method of placement, both with the single and double-strength fertilizers, was replicated five times. An adequate number of check plots, receiving no fertilizer, was included. The distribution of the different treatments was such that no plots adjoined each other more than once and all the rows included in the experiment were treated alike as regards cultivating, spraying, etc. At harvest time yields were obtained on two sections in each row thus providing 10 replications of each of the various treatments and the checks. Total yields were obtained from these blocks and, in addition, twenty hills were harvested from near the end of each row, giving 10 replications of 20 hills each. The total weight of each hill was obtained as was the number of tubers and their individual weight.

During the growing season counts were made at various times to determine the stand and general condition of each plot. When these counts were made the plants were carefully observed for evidences of diseases but none was found which would interfere in any way with yields. In late August, the section of the State in which the work was conducted was visited by a hail storm but since the crop had almost matured it is questionable if this interfered in any way with the results.

In view of the fact that the results obtained from the three tests, two in 1931 and one in 1932, vary but little, averages only will be discussed in this presentation.

INFLUENCE OF FERTILIZER PLACEMENT ON GERMINATION AND SUBSEQUENT GROWTH

Germination counts were made when the largest plants were up four to five inches. A second count was made just before the plants were in bloom. On the early crop these counts were made on May 26 and June 7 and on the late crop, August 21 and September 25. The results of these counts are presented in Table 1. Germination counts were made on two twenty-five or fifty foot strips on each row, giving ten replications for each of the fertilizer treatments. It will be seen that the location of fertilizer either under the seed piece or

TABLE 1.—*Influence of placement of fertilizer on germination and plant growth. Season of 1932. Planting dates, April 27 and 28*

No.	Fertilizer analysis	Placement of fertilizer	Stand Check-100	Final stand Check-100	Ave. width of plants
					Inches
1	4–8–7	2 inches from seed piece, same plane	105.9	99.6	59.3
2	8–16–14	2 inches from seed piece, same plane	104.7	98.4	61.4
3	8–16–14	4 inches from seed piece, same plane	102.6	99.6	60.6
4	4–8–7	2 inches from, 2 inches below seed piece	102.1	101.1	57.9
5	8–16–14	Over seed piece	101.6	97.7	55.6
6	8–16–14	2 inches from, 2 inches below seed piece	101.4	99.7	58.6
7	4–8–7	Over seed piece	98.6	98.1	53.1
8	4–8–7	4 inches from seed piece, same plane	96.6	100.3	59.4
9	4–8–7	Under seed piece	84.8	98.6	54.2
10	8–16–14	Under seed piece	83.3	99.4	52.8
11	8–16–14	Mixed in row	80.5	97.8	48.7
12	4–8–7	Mixed in row	75.9	97.6	51.7
	Check	No fertilizer	100.0	100.0	39.0

mixed in the row greatly retarded germination whereas the location of the fertilizer on each side of the seed piece apparently hastened germination somewhat. The final germination counts indicate but slight differences in stand following the various treatments, the only exception being in those cases where the fertilizer was applied under the seed piece either in a band with fertilizer-free soil interposed or mixed with soil.

In all three of these tests the width of the vines was measured when the plants were approximately in full bloom. These measurements were made on June 30 and September 25 in the early and late crops respectively. It will be observed that in most cases the largest plants were associated with earliest germination. On those plots where the fertilizer was mixed in the row or applied under or over the seed piece the plants were much smaller. In this connection it should be pointed out that earlier in the growth of the plants even

greater differences were noted in the size of the plants on the different treatments. Only slight differences were observed at any time between those plots where the fertilizer was applied at the sides of the seed piece.

It is apparent that time of germination and size of plants is a factor of some importance in determining yields since, as will be shown later, with but few exceptions, the fertilizer placements resulting in earliest germination and the largest plants likewise produced the largest yield of tubers.

INFLUENCE OF FERTILIZER PLACEMENT ON NUMBER AND WEIGHT OF TUBERS

As previously indicated individual hill records were obtained in each of the three years. The total number of tubers per hill and their

TABLE 2.—*Influence of fertilizer placement on the number and weight of tubers per hill and the yield per acre—1932*

Planted April 27–28 Harvested, Sept. 13–14

No.	Fertilizer analysis	Placement of fertilizer	Tubers per hill		Ave. wt. all tubers	Ave. wt. per hill	Bushels per acre
			Total No. ave.	% over 57 gr.			
					grams	*grams*	
1	4–8–7	2 inches from, 2 inches below seed piece	7.60	45.3	62.4	463.9	243.7
2	8–16–14	2 inches from, 2 inches below seed piece	7.79	44.0	62.6	471.4	239.7
3	8–14–16	2 inches from seed piece on same plane	7.71	42.6	64.9	478.4	239.6
4	4–8–7	2 inches from seed piece on same plane	7.66	43.2	59.9	458.8	238.9
5	8–16–14	4 inches from seed piece on same plane	7.84	42.4	61.2	471.6	234.1
6	4–8–7	4 inches from seed piece on same plane	7.86	42.4	61.0	451.4	230.8
7	8–16–14	Under seed piece	6.93	45.7	66.9	441.9	220.8
8	4–8–7	Under seed piece	7.30	45.6	63.9	457.9	216.9
9	8–16–14	Over seed piece	7.93	40.0	56.3	431.1	215.0
10	4–8–7	Mixed in row	6.38	49.6	68.6	432.8	215.0
11	4–8–7	Over seed piece	7.12	41.2	61.2	420.7	211.8
12	8–16–14	Mixed in row	6.56	46.2	66.6	422.9	209.2
	Check	No fertilizer	6.59	40.1	53.1	350.8	165.3

average weight are shown in Table 2. It will be noticed that the largest number of tubers was produced where an 8–16–14 mixture was applied over the seed piece. It should be pointed out, however, that where a 4–8–7 mixture was applied in the same manner the number of tubers was greatly reduced. It is difficult to explain this, except to state that in each of the three tests the 8–16–14 mixture when applied in this manner gave a much larger number of tubers than did the 4–8–7 mixture.

Apart from this placement of fertilizer the largest total number of tubers was produced on those plots where the fertilizer was applied at the side of the seed piece. It is interesting to note also that the number of tubers was approximately identical in the case of the locations 2 and 4 inches from the seed piece and 2 inches from and 2 inches below the seed piece. Fewest tubers followed the application of the fertilizer either under the seed piece or mixed in the row. With the exception of the latter location, all of the treatments resulted in a larger number of tubers per hill than in the case of the unfertilized plots.

Tuber number is, of course, important in determining yields since, as will be shown later, in general the plots producing largest number of tubers likewise produced largest yields. It is important, however, that some consideration be given to tuber size since it is conceivable that a treatment giving fewer tubers may be more desirable because of the size of the individual tubers. An examination of the data presented in columns 2 and 3 of Table 2 shows that, almost without exception, those treatments producing fewest tubers produced both the largest and the greatest percentage of tubers over 57 grams in weight. It is of particular interest to note that the treatment producing the largest number of all tubers, *i.e.*, the 8–16–14 mixture applied over the seed piece, likewise produced the smallest tubers. On the other hand, both the largest tubers, as measured by their average weights, and the greatest proportion of tubers over 57 grams were produced on those plots where the fertilizer was applied underneath the seed piece. These results have been of the same order in all three tests despite the fact that there were marked differences in the moisture content of the soil in the two seasons.

In this connection it must be pointed out that in 1932 the fertilizer was much more thoroughly mixed with the soil than in 1931. The results in the latter year indicated that while this method was not desirable it was better than where the fertilizer was not mixed with the soil in the row, that is, where it came in direct contact with the seed piece. Although a larger proportion of the tubers weighing over 57 grams was produced, in the case of the "mixed in the row" location, this was offset by the larger total number of tubers produced where the fertilizer was applied at the side of the seed piece.

In considering the influence of fertilizer placement on the number of tubers it should be pointed out that the total number was influenced very little by the plant food concentration of the fertilizer. This is evident from the fact that the average number of all tubers in the different fertilizer placements was 7.46 for the 8–16–14 mixture as compared with 7.32 where the 5–8–7 mixture was used. It is of interest to note also that of the six placements producing largest numbers of tubers, two received the 4–8–7 and four the 8–16–14 mixture.

INFLUENCE OF FERTILIZER PLACEMENT ON TOTAL YIELDS

The average weight in grams per hill is shown in Column 4 and the total yield per acre in Column 5 of Table 2.

Before discussing these data it might be well to point out that in the case of the early crop in 1931 the yield differences between the highest and lowest yielding fertilizer plots was 74.7 bushels and in the late crop, 45.4 bushels. In 1932 the difference was 34.5 bushels. On the early crop in 1931 the largest total yields followed the application of the fertilizer either two inches to the side or two inches to the side and two inches below the seed piece. Regardless of fertilizer concentration there was little to choose between these two treatments. They were followed in order by the four inches to the side location. On the late crop, largest yields were obtained where the fertilizer was applied two inches on each side and two inches below or four inches on each side of the seed piece. The placement two inches to the side, followed in close order. In 1932 these three side placements again produced largest total yields. In all three field experiments lowest total yields were obtained with the placement of the fertilizer either over or under the seed piece or mixed in the row.

The yield in grams per hill for the different fertilizer placements is shown in the next to the last column of Table 2. It will be noted that in general these data occupy the same general position as the total acre yield. The average yield for the placement of fertilizer to each side of the seed piece was 465.9 and for the placements under and over the seed piece, or mixed in the row, 434.5 grams. Individual differences between the total acre yield and the weight per hill are due, for most part, to the fact that in the former case no correction was made for missing hills.

The plant food concentration of the fertilizer mixture apparently had but little influence on total yields. In comparing the three side placements 8–16–14 with the 4–8–7 mixture, for example, the average yields are found to be the same, 237.8 bushels per acre. Where the above, below and mixed in the row placements are compared the average yield in the case of the 4–8–7 mixture was 214.6 and of the 8–16–14, 215.0 bushels. Plant food concentration of mixture can, therefore, apparently be dismissed as a factor in determining yields.

That this is not true for the placement of the fertilizer is apparent from Table 2 and from the following summary. In the latter the 4–8–7 and 8–16–14 mixtures applied in the different locations have been averaged.

Placement of fertilizer	Bushels per acre
2 in. from, 2 in. below seed	241.7
2 in. from seed on same plane	239.2
4 in. from seed on same plane	232.4
Under seed piece	218.8
Over seed piece	213.4
Mixed in row	212.1

SUMMARY

Briefly the results of the fertilizer placement studies with the potato in New Jersey during 1931 and 1932 may be summarized as follows:

1. Germination was influenced by the location of the fertilizer, being seriously retarded where the fertilizer was applied in the row or under the seed piece and slightly retarded where the fertilizer was applied over the seed piece. Earliest germination, most uniform growth and largest vines, followed the application of the fertilizer in two bands, one on each side of the seed piece. The plant food concentration of the fertilizer mixture had little if any influence on germination or subsequent plant growth.

2. Largest number of tubers were produced where the fertilizer was located at the side of the seed piece. Smallest number of tubers followed where the fertilizer was applied in the row. In general, those locations producing smallest number of tubers likewise produced largest tubers. The concentration of the fertilizer had little or no influence on either tuber number or size.

3. Largest total yields resulted from side application of the fertilizer, regardless of whether on or below seed piece level. Comparing the three to-the-side applications with those above or below the seed piece, or mixed in the row, the average differences for the three years were as follows: Early planted crop in 1931, 32.6 bushels; late planted crop in 1931, 15.3 bushels; and early planted crop in 1932, 21.6 bushels.

On the basis of acre yield of tubers weighing more than 57 grams, lowest yields followed the above or below applications with largest yields following the location of the fertilizer on each side of the seed piece. Where the fertilizer was mixed in the soil the total yield of tubers in this class fell between these two groups.

The main result of these three experiments, conducted under quite different conditions, indicates that for largest returns the fertilizer should be applied in a band 2 inches to each side of and on the same plane as the seed piece or 2 inches to each side of and 2 inches below the seed piece.

THE IDENTITY OF "JERSEY RED SKIN" OR "RED SKINS"

WM. STUART

For a number of years the true name of the Jersey Red Skin has been a source of considerable conjecture not only to the writer but to several others interested in potato nomenclature. The occasional suggestion that it was identical with Dakota Red has recently resulted in a more careful comparison of the varietal characteristics of Dakota Red as obtained from the original description of this variety. In the course of this comparative study the writer has had occasion to study both Dakota Red and the Dakota Seedling and has found somewhat to his surprise that these two varieties are not, as he had previously supposed, identical. On the contrary their descriptions clearly indicate that they are widely different both in habit of growth as well as in tuber characters. These varietal differences are readily noted from the following descriptions:

Dakota Red: Supposedly originated by O. H. Alexander, of Charlotte, Vermont, from seed resulting from hybridizations by C. G. Pringle, also of Charlotte, Vermont, who had contracted with the seed firm of B. K. Bliss and Sons to produce hybridized potato seed at $1,000.00 per pound. It was listed in the 1883 seed catalogues of W. P. Andruss and H. Sibley. In the latter's 1884 catalogue, page 36, it is described as having stocky plants which stand drouth well because its roots go deep. The tubers are described as being very handsome in appearance, form, long wedge-shaped. Skin firm, reddish flesh-color, flesh white. B. K. Bliss and Sons' 1884 Potato Catalogue, page 6, describes it as a medium late variety, thriving well on both sand and clay soils. Plants erect and stocky. Tubers long and wedge-shaped; skin firm, reddish flesh-colored; eyes irregular, some smooth and some deep, but few in number.

Dakota Seedling: This variety is said to have been originated in Dakota by John Moore. It is mentioned in the Cultivator and Country Gentleman, Volume 53, page 390, 1888, as having been received by the editor from J. A. Everitt, a seedsman of Indianapolis, Indiana, presumably in the spring of 1888. The tubers are described as being very large and ovoid in shape with smooth skin and shallow eyes. In Delano Bros. 1890 catalogue, page 13, the tubers are described as oblong in shape with protuberant eyes. Skin pink, very smooth. Flesh

white. The description is accompanied by a cut showing general appearance of the tuber. The description given in the Delano Bros. catalogue coincides with the writer's recollection of the Dakota Seedling as grown on his father's farm in the latter part of the '70's and early '80's.

Jersey Red Skin, Red Skins, etc. A letter received by the writer from H. J. Presley of Perry's Lake, Ohio, under date of March 15, 1919, furnishes an interesting picture of the number of "aliases" under which Jersey Red Skin was known at that time. In this letter Presley refers to this variety as the New Jersey Red Skin and lists the following names as synonyms—California Red, Canada Red, Crimson Beauty, Victor Rose, Old Early Rose, Best and Southern Wonder Redskin.

In view of the fact that Mr. Presley was one of the "old-time" ardent potato variety enthusiasts and as such possessed an unusual intimacy with potato varieties his list of synonyms indicates rather clearly the confusion of names under which this variety or others similar in characters was or were known.

Whether the writer subscribes to the above list of varietal names as being identical with Jersey Red Skin or as we now propose to designate it—Dakota Red—is immaterial. Our immediate interest is in a description of the variety Jersey Red Skin as now known and a comparison of the same with that of Dakota Red.

Jersey Red Skin: No information in regard to its origin. Season late. Plants medium to large. Stems many, erect, stout, angular, winged, dark purple. Nodes slightly swollen, much colored. *Internodes* medium in length. Leaves medium to large, glossy, dark bluish green. Flowers few, mostly falling off before opening. Corolla light shade of pink or rose color. Tubers large, medium uniform, mostly elongated, flattened and somewhat wedge-shaped; surface variable as to smoothness or knobbiness. Distal end mostly rounded, proximal end mostly obtuse. Cavity small, narrow, shallow, regular. Skin red to deep flesh color, uniform. Flesh white. Eyes many, singly, large, shallow or protuberant, red. Eyebrows prominent, medium long, curved.

A variety grown in the Department's variety collection at Presque Isle, Maine, in 1927 under the name of Crimson Beauty proved to be identical with Jersey Red Skin.

Owing to the meagerness of description of plant characters of the Dakota Red it is not possible to make very close comparison with those of the Jersey Red Skin except as to habit of growth particularly with respect to erectness and stocky stems. In tuber shape, skin color and eye characteristics it is believed that the Jersey Red Skin and the Dakota Red are identical. Furthermore the season of maturity and

ability to thrive on light or heavy soils afford additional proof of their identity.

In summing up the evidence, therefore, one cannot arrive at any other conclusion than that the Jersey Red Skin is the old Dakota Red, and it is suggested that it hereafter be so designated. For the time being it should be referred to as Dakota Red (Syn. Jersey Red Skin, Red Skins, etc.).

SOME FALSE NOTIONS ABOUT POTATO VARIETIES

E. V. HARDENBURG
Cornell University

If it were practicable to take a census of potato varieties grown on all the farms where potatoes are grown in the United States, hundreds of varieties would be found. The task would be interesting but probably not worth while. Many of the names listed would have no significance because they would indicate nothing in respect to yield, eating quality or other characteristics of the variety concerned. Although much progress in potato variety standardization has been made in the last 15 years, variety names still play a very small part in potato marketing. In ordering from her grocer, the housewife is much more likely to say, "Send me a peck of potatoes" than she is to say, "I want a peck of Green Mountain potatoes."

It is a safe assertion that differences between McIntosh, Northern Spy and Ben Davis apples are much better known by the consumer than are differences between Cobbler, Rural and Triumph potatoes. Perhaps the reason for this situation is the fact that potato varieties are more difficult to identify than are apple varieties.

About 200 varieties of potatoes are listed and described by the United States Department of Agriculture as grown in the United States. But many of these are so similar that it is now possible to classify all those commercially important into about 20 distinct types. Of these types only Cobbler, Triumph, Spaulding Rose, Early Ohio, Burbank, Russet Burbank, Green Mountain, White Rural, Russet Rural and Perfect Peachblow are grown very extensively in the United States at the present time.

ORIGIN AND LIFE OF VARIETIES

There are four ways by which our present-day potato varieties have originated. Origin by chance seedling has produced more varieties than any other method. Such varieties are produced from seed taken from potato seed balls found in the field late in the season. In many cases, such varieties do not even resemble the parent from which they came and are usually of little or no commercial value. In other

words, accidental seed found in the potato field usually does not breed true. For these reasons, growers are not encouraged to attempt to originate improved varieties by this method. However, well-known varieties which have been originated in this way are Early Rose, Burbank Seedling, Early Ohio, Rural New Yorker No. 2, Sir Walter Raleigh, Carman No. 3 and Beauty of Hebron.

A second method of origin is that of crossing artificially two varieties, the good characters of which it is desired to combine into one variety. Such well-known varieties as Green Mountain, Norcross and Bliss Triumph were produced in this way. Recently the United States Department of Agriculture has produced by this method three new varieties named Katahdin, Chippewa and Golden. They are now on trial and their popularity will depend on whether they are good enough to supersede existing varieties. These varieties represent years of work and have been chosen as the most promising of thousands of seedlings developed at Washington. No seed is as yet available for general distribution. Growers are urged to wait at least two or three years before attempting their commercial production. If they prove worthy, seed may be available by that time.

Origin of varieties by hybridization is handicapped by lack of viable pollen in the blossoms of most of our cultivated sorts. Seedballs are not nearly so commonly found in our potato fields today as they were forty years ago. The reason is that we are not growing the same varieties now as then.

A third method or origin of varieties is by mutation or bud sports. A sudden change in character of tuber or plant which can be propagated is called a bud sport. Such varieties as Noroton Beauty, Pearl and White Triumph came to us in this way. In each case a white tuber suddenly occurred in a red or blue skinned variety.

Finally, a fourth method of origin is that of selection within some existing variety for increased yield, disease resistance or other desirable character. Such was the origin of our well-known varieties, Heavyweight and Number 9.

One of the most common fallacies held by potato growers is the theory of senility or the idea that varieties "run out" because of old age. Many growers cite as evidence the fact that such old varieties as Early Peachblow, Beauty of Hebron, White Star, Lady Finger, Early Rose, Black Meshannock and Blue Mercer are no longer grown commercially. And it is a fact that very few varieties have remained in cultivation longer than 50 years. But the reason they have gone is because better varieties were developed to take their place. All of these old varieties would be extremely unpopular on the market today because they were colored skinned or deep eyed or irregular in shape. The varieties of today are quite the opposite. Yet

these old varieties did not die out from old age. The proof is in the fact that all of them can be found on certain farms today where they are apparently yielding as well as they ever did.

We might well pay tribute to a man who probably more than any other is responsible for some of our best present-day varieties. I refer to Elbert S. Carman, who for many years was editor and owner of the *Rural New Yorker*. During the years 1882 to 1896 he developed and really gave to the public the four well known and still popular varieties, Rural New Yorker No. 2, Carman No. 1, Sir Walter Raleigh and Carman No. 3. His modesty alone prevented him from having even a fraction of the notoriety which was his due. Somewhat in contrast is the case of Luther Burbank, well known for his many horticultural productions. Burbank also produced a well known and widely-grown variety, the Burbank. The records indicate that he selected this variety from some of the seedlings grown from a chance seed-ball found in his grandmother's garden in Indiana.

QUALITY IN POTATO VARIETIES

Many consumers and some growers entertain the hope that somewhere there is to be found the one best quality variety. But the difficulty here is that no two persons may exactly agree as to what quality is. Furthermore, a variety best suited for baking may not be best for boiling, or frying, or chip making. In general, it can be said that the French and English prefer varieties that are waxy and hold their shape after cooking. In contrast, the Germans and the Americans seem to prefer varieties that are high in starch, mealy when cooked and that do not hold together after cooking. Consequently, varieties of the Up-to-date type are grown almost exclusively in the British Isles and France while this type is almost unknown in Germany and the United States. Many city folk think they prefer the Burbank variety grown in Idaho and in the Pacific Coast states rather than our locally-grown varieties of the Green Mountain and Rural types. But this preference can hardly be based on any difference in tuber composition because varieties other than Burbank properly grown and matured are just as high in starch content. The fact is that, after all, quality in potatoes is more dependent on soil, climate and maturity than on variety itself.

Another false notion which is gradually being eliminated is that potatoes grown on muck soil are likely to be soggy and of poor quality. This notion probably originated years ago when most of our muck soils were poorly drained. The result was poor quality regardless of variety. But the same effect on quality is obtained in heavy or poorly-drained upland soils. Today most of our muck-grown crop is not only as high in eating quality but the tubers are even better in shape and freer from defects than the crop from upland soil.

CHOOSING A VARIETY TO GROW

We often get inquiries as to what is the best variety to grow in a given locality. Before we can answer such a question intelligently, it is necessary to know the type of soil and something of the climate. Even then it is possible only to suggest what type of potato is best adapted. All commercial varieties have been classified into a relatively few groups or types, each class having certain tuber and plant characters in common. For example, the Rural group includes about a dozen well known or standard varieties which cannot be distinguished one from another and all of which have the same soil and climatic adaptations. The same is true of all varieties of the Cobbler and the Green Mountain type. If the soil is heavy and the mean summer temperature high, we recommend any standard variety of the Rural type. If the soil is light and the climate cool, any variety of the Green Mountain, or of the Cobbler type may be grown successfully. In other words, varieties of the Rural type, such as Rural New Yorker No. 2, Sir Walter Raleigh, Carman No. 3, Number 9, Heavyweight and Russet Rural withstand heat and drought better than do varieties of these other types. We try to emphasize that variety names are of little importance except as they designate the type best adapted for growth in a given situation.

It is unfortunate that so much emphasis has been put upon the results of variety tests of potatoes in the past. Such results have been often misleading simply because the variety that happened to yield highest was assumed to be the best to grow. The fact is, that particular variety may have yielded best simply because it contained least disease or because it happened to be a sample from a high yielding strain. Had a poor yielding strain of the same variety been chosen for the test, the result would have been quite the reverse. We must conclude, therefore, that only by testing a large number of healthy strains of a given variety can the inherent yield of that variety be determined. An increased appreciation of this fact in recent years apparently has resulted in a decrease in the number of variety tests conducted.

There are two other false notions about potato varieties which should be corrected. The fact that a variety fails to produce blossoms is no indication that it will not yield a good crop. Although some varieties blossom more profusely than others, all varieties usually either fail to bloom at all or else produce only a few buds during hot seasons. Finally, some growers believe that two varieties planted close together become sexually crossed. Inasmuch as potatoes are not usually propagated from true seed such mixing of varieties, of course, is not possible.

SPRAYER INJURY TO POTATOES

B. A. BROWN

Storrs, Connecticut

Recently Fitch reported on the amount of damage by tractor and truck wheels in spraying potatoes on muck soils in Iowa.[1] That sufficient sprayer injury to affect yields appreciably may occur under quite different conditions is indicated by some data obtained in Connecticut. In a potato fertilizer experiment in this state, were included 32 plots, each 100 feet long and 15 feet (5 rows) wide. The spraying was done with a horse-drawn, two-wheeled, six-row, outfit, with power furnished by a gasoline engine. Of the six rows sprayed at one trip, one side of four of them was trampled by the horses and run over by the wheels of the sprayer. No vine lifters or other devices were used to prevent injury. Moreover, in "hilling" these potatoes, most of the loose soil was removed from the center of the space between the rows and after several sprayings, the soil in these centers became very compact. Under these conditions, most of the vines falling across that six- to eight-inch space were badly crushed, if not killed. To learn if the yields were affected by such injuries, the potatoes from each row of the plots were dug and weighed separately for three years. A brief summary of these results follows:

Year	Number of comparisons	Percent of cases where untouched rows had larger yields	Average difference in favor of untouched rows (bus. per acre)
1929	41	40	−5 ± 4.9
1930	44	86	31 ± 3.1
1931	41	71	45 ± 7.2

Significant differences in favor of the rows not injured by horses or sprayer wheels were obtained in 1930 and 1931, but not in 1929. A careful study of the data and the factors involved in this work have not suggested any reasons for this lack of seasonal uniformity. The only controllable factor changed on these permanent plots during the three years was that the path of the sprayer was different each season. One would scarcely expect this to influence the results.

Another perplexing problem arising from this project is the frequency with which rows damaged by the sprayer on their west side have outyielded those injured on the east side. In 1931, of the 40 exact comparisons on this point, the yields of 38 were larger when the

[1] Fitch, C. L. Wheel damage to potatoes with large sprayers on muck soils. AMER. POT. JOUR. 9: 1, pp. 5–7, 1932.

rows were injured on the west side. The average difference in yield was 77 bushels per acre, which is even greater than that between touched and untouched rows. In 1930, 35 of the 49 comparisons favored the rows to the east of the path of the sprayer wheels (west side of row damaged) and the average difference in yields was 14 bushels per acre. However, in 1929, as in the comparisons between the damaged and undamaged rows that year, there were no significant differences in the yields of the rows damaged on the east or west sides.

Although more questions than answers arise from these facts, they are published with the hope that others will suggest ideas or information which will help to clarify the situation. For example, are the sun's rays from the east of more value to plants than those from the west? From a practical point of view, it is obvious that in some years, more damage may be done by spraying during the latter part of the season than is gained by the practice. This would be particularly true where the spraying is done with small outfits. However, the writer does not wish to leave the impression that it is advisable to stop spraying when the vines begin to fill the rows, but rather that due care should be taken to prevent possible injuries in this important operation.

SECTIONAL NOTES

MARYLAND

The storm which swept the Eastern Shore during the latter part of August injured all of the fields entered for certification and some were totally destroyed. Water stood on many fields for several days. In spite of these conditions 525 acres of potatoes were entered for certification in comparison with 505.75 in 1932. This increase was due entirely to the increase in acreage of mountain-grown potatoes entered for certification this year. In 1932, 188.25 acres of mountain-grown seed were entered and 106.75 acres were eligible for certification. In 1933, 216.25 were entered and 155 acres were eligible. Varieties entered for certification consist almost exclusively of Irish Cobbler, Smooth Rural, Rural Russet, Jersey Redskin, and Green Mountain. A few Katahdin, McCormick, Bliss Triumph and Spaulding Rose were inspected. Fields were found to be unusually free from virus diseases, many showing only a trace, while a few showed no diseased plants.—R. A. JEHLE.

NORTH CAROLINA

The condition of Irish potatoes in North Carolina on September 1st was about the same as last year. This applies only to the late crop, the early crop having been harvested and disposed of during June and July. The late crop in the Coastal Plain is grown from seed taken from the early crop and a large part of the resulting crop is

saved for seed to be used the following spring. It is interesting to note that this home-grown seed will produce as good yields as northern-grown or mountain seed, but the crop is from two to three weeks later.

There has been a considerable increase in the production of certified seed in the mountain section of the state this year. However, this will be largely offset by the fact that, due to the rise in price of potatoes and the good demand, many growers are selling their seed potatoes for eating stock. There is a fraction over an acre of registered Katahdins, grown from tuber index seed stock. This variety has made a very favorable impression on the growers of the mountain section.

For the third consecutive season there was practically no late blight on our main crop potatoes. On the other hand, leaf hoppers and flea beeties caused serious damage in some fields. In the east the late crop has been somewhat damaged by the recent storms and excessive rainfall.—ROBERT SCHMIDT.

NEW JERSEY

Approximately 760 acres of potatoes were entered for certification this year. Most of the acreage is planted with the Irish Cobbler variety, with a few acres of Green Mountains and 75 acres of New Jersey Redskins. Low areas in fields were injured by storms but, apart from this, the condition of the crop is much better than it has been for several years. The vines are filling the rows, the set is good and very little disease has been found.

The late crop in New Jersey is planted about August 1 with seed held in cold storage from the previous year. This year a large part of the acreage is planted with seed from Maine or Prince Edward Island although a considerable acreage is planted with seed grown in New Jersey last year. The fields planted with this seed are as free from disease as those planted with seed from any other source. Excellent yields followed the use of late crop seed this spring and, as a consequence, there promises to be a brisk demand for seed this fall.

Potato spraying again demonstrated its value this year. In the absence of both early and late blight, six applications of a 5–5–50 Bordeaux mixture, prepared with hydrated lime, gave an average yield increase of 55.9 bushels per acre. The increased yield resulted largely from the control of the flea beetle and leaf hopper. Spraying experiments with the Irish Cobbler variety the past six years have shown an average increase of 58.7 bushels per acre.—WM. H. MARTIN.

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